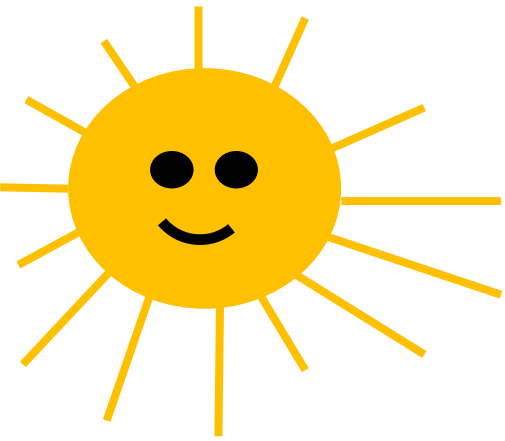


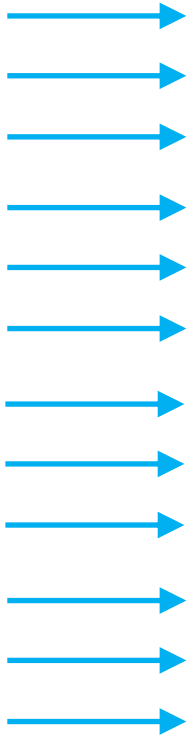
Fourteen solar dryer types



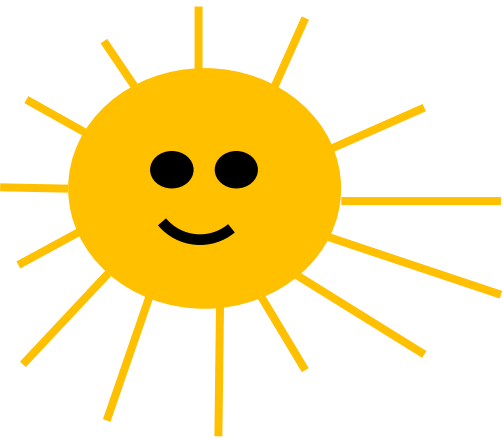


For a solar dryer,
we need

Sunshine and

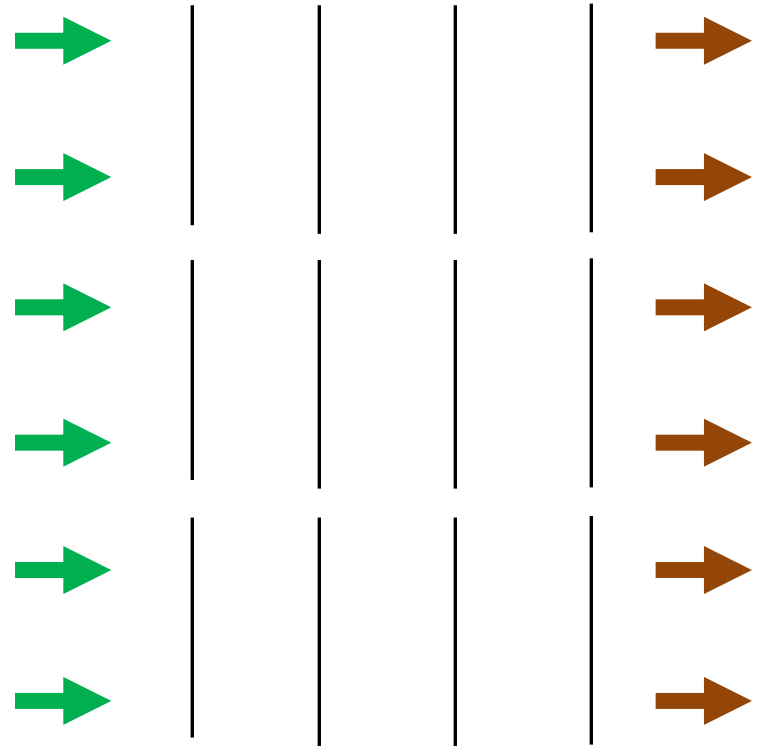
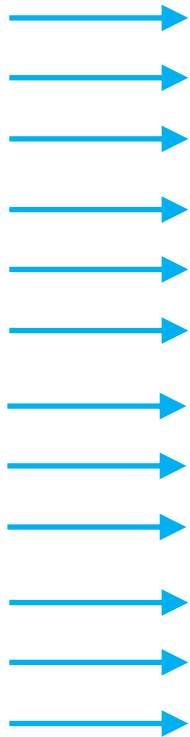


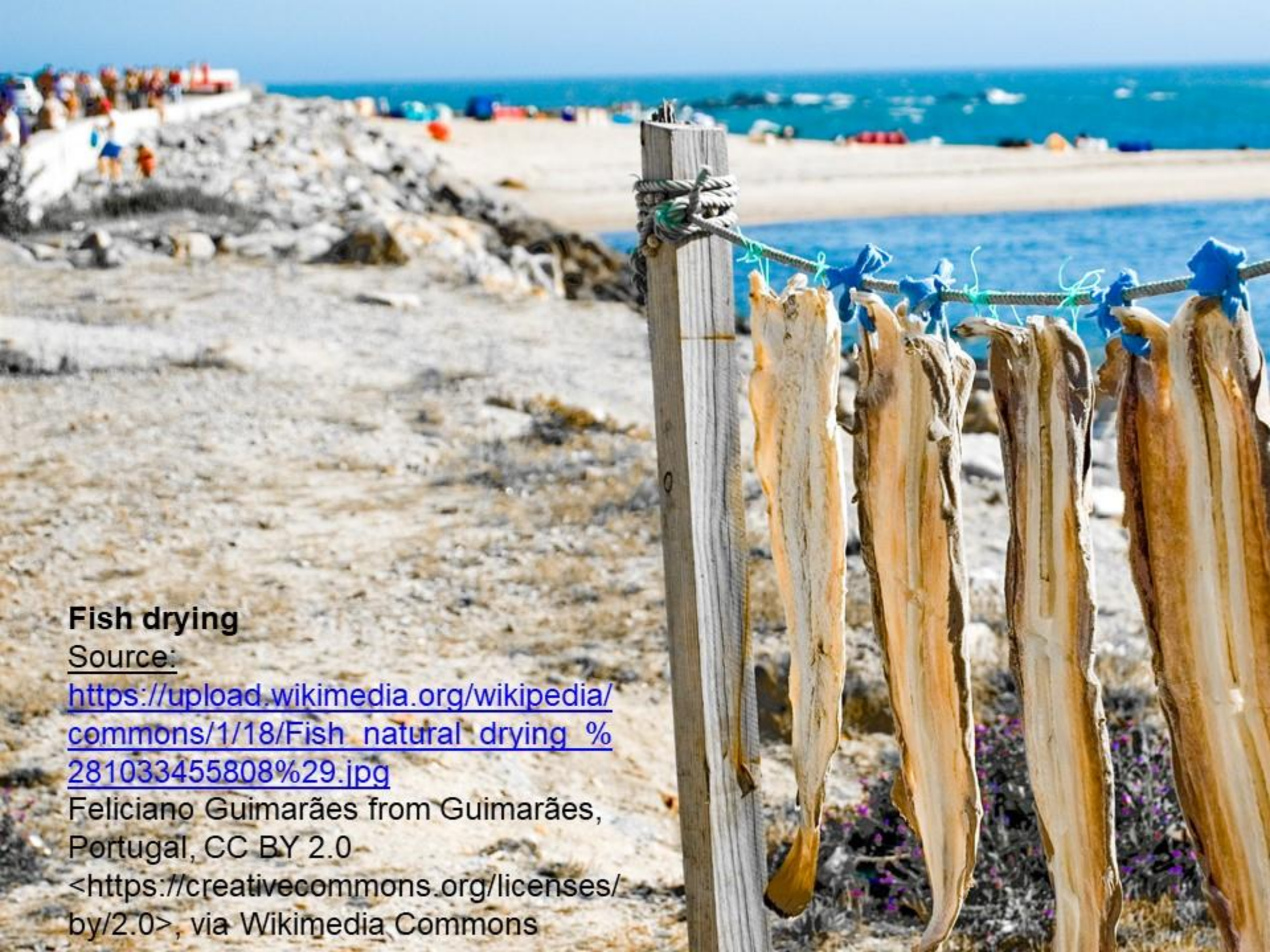
Wind.



1) Natural dryer by suspension

Products are separated by hanging to expose a maximal surface for sun drying.





Fish drying

Source:

https://upload.wikimedia.org/wikipedia/commons/1/18/Fish_natural_drying_%281033455808%29.jpg

Feliciano Guimarães from Guimarães, Portugal, CC BY 2.0

<<https://creativecommons.org/licenses/by/2.0>>, via Wikimedia Commons

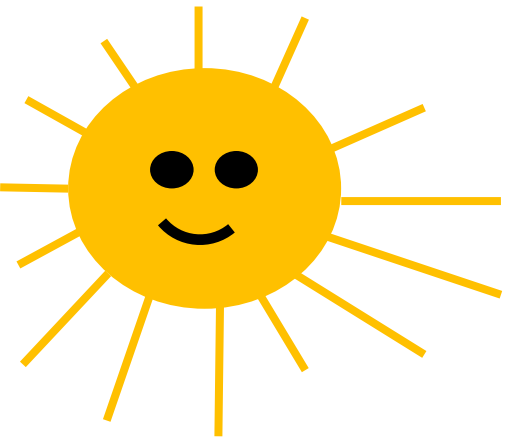


Tobacco drying

Source:

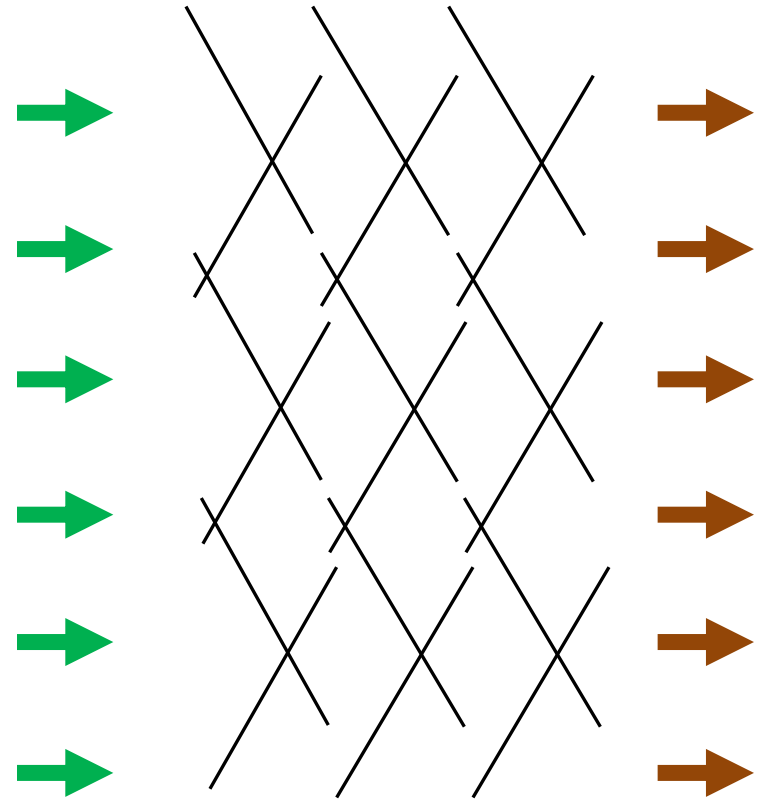
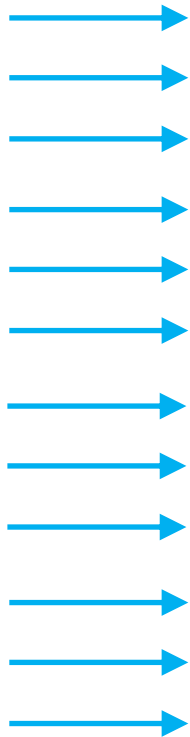
<https://upload.wikimedia.org/wikipedia/commons/e/e2/Tabakbl%C3%A4tter.JPG>

Gliwi, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>> via
Wikimedia Commons



2) Natural dryer by stacking

Products are separated by piling them up to expose a maximal surface for sun drying.





Blanks stacked

Source:

https://upload.wikimedia.org/wikipedia/commons/4/45/Photograph_of_Heading_Blanks_Stacked_for_Drying_-_NARA_-_2129517.jpg

National Archives and Records

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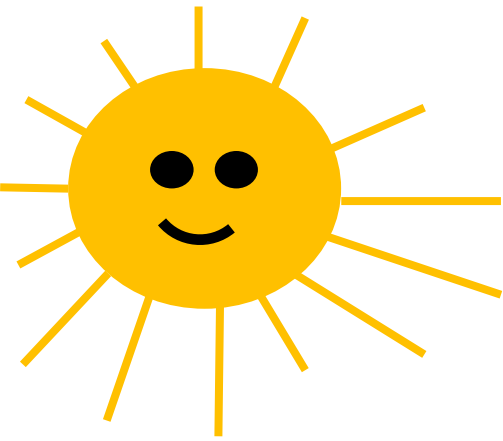
Blanks stacked

Source:

https://upload.wikimedia.org/wikipedia/commons/a/a4/Neat_organized_wood_drying_rack_%283947424419%29.jpg

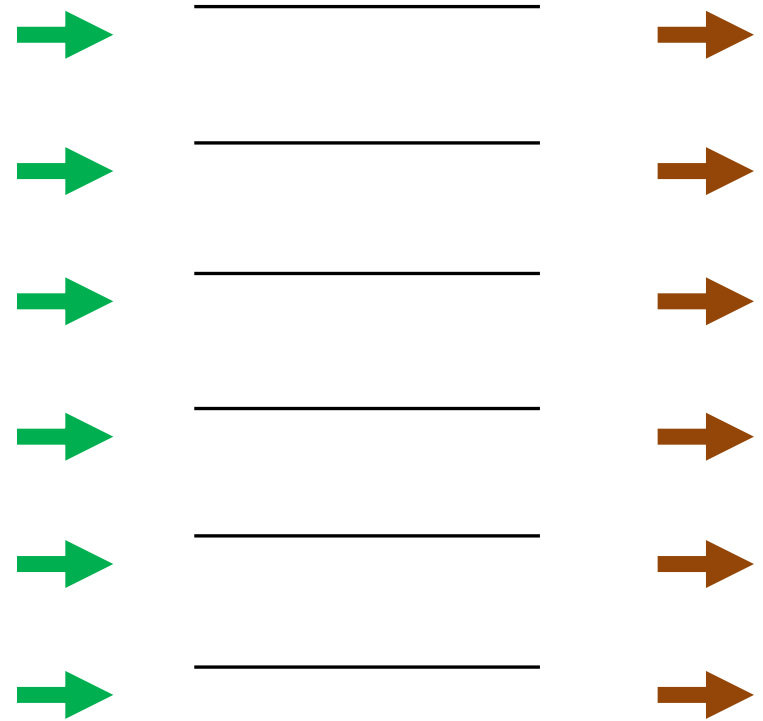
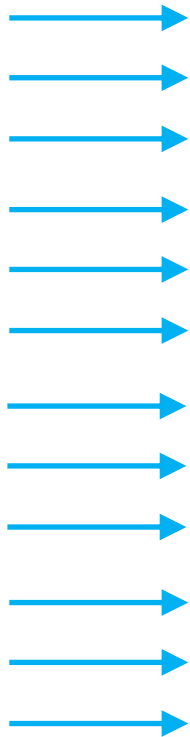
edward stojakovic from chicago, United States, CC BY 2.0

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3) Natural dryer by spreading

Products are separated by spreading them out on the floor to expose a maximal surface for sun drying.





Source:

[https://upload.wikimedia.org/wikipedia/commons/0/0f/Drying the coffee beans - Flickr - S. Rae.jpg](https://upload.wikimedia.org/wikipedia/commons/0/0f/Drying%20the%20coffee%20beans%20-%20Flickr%20-%20S.%20Rae.jpg)

S. Rae from Scotland,
UK, CC BY 2.0

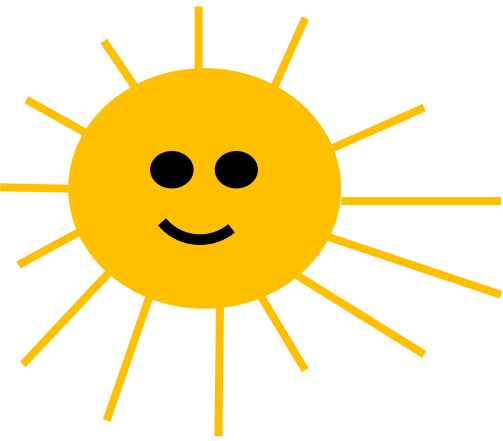
<<https://creativecommons.org/licenses/by/2.0>>, via
Wikimedia Commons



Traditional coffee drying at the Alto Boquete plant of Cafe Ruiz, Boquete, Panamá

Source:

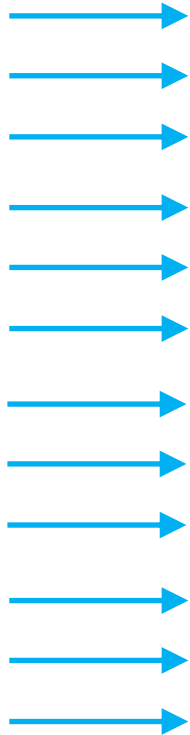
[File:DirkvdM coffee-drying.jpg - Wikimedia Commons](#)



4) Natural dryer with mechanical device

Products can be tipped onto a conveyor such as a belt transporter, screw, scraper, moving floor etc.

A stirrer, agitator or metering drum helps to optimize the drying effect by turning around the product periodically.

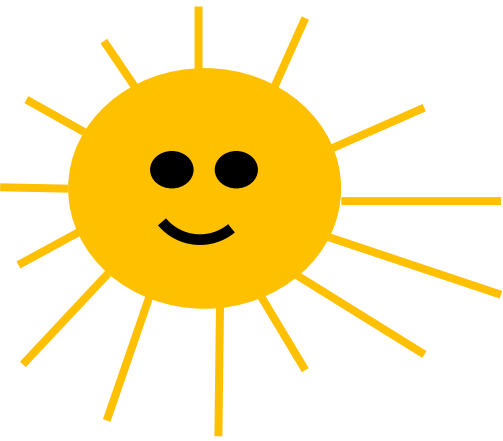




Organic residues of a screen are spread on a large moving floor.

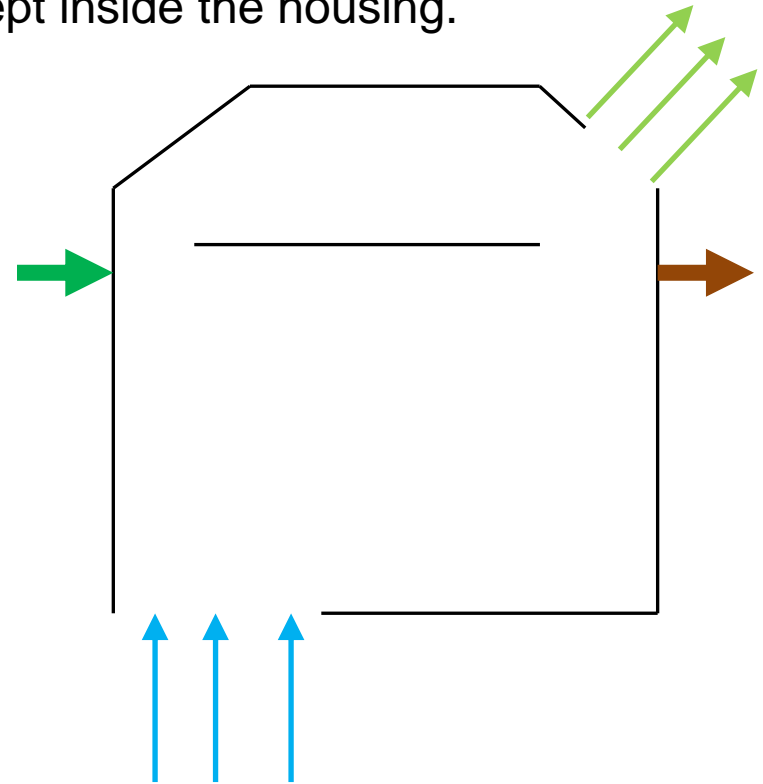
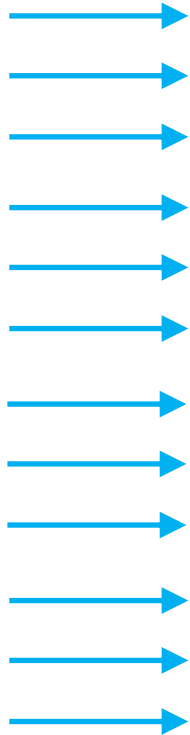


River waste
is mixed up
steadily
thanks to a
double
moving floor
and dries
quickly.



5) Direct solar dryer

The exposed product is protected by a tent or a glass window against rain. Sunshine is converted into infrared energy (heat radiation) and can be kept inside the housing.





Direct solar dryer at farm

Source:

[https://upload.wikimedia.org/wikipedia/commons/9/95/Solar dryers being installed at date farms are cost-effective since they do not need any electricity. %287702804206%29.jpg](https://upload.wikimedia.org/wikipedia/commons/9/95/Solar_dryers_being_installed_at_date_farms_are_cost-effective_since_they_do_not_need_any_electricity.%287702804206%29.jpg)

USAID Pakistan, Public domain,
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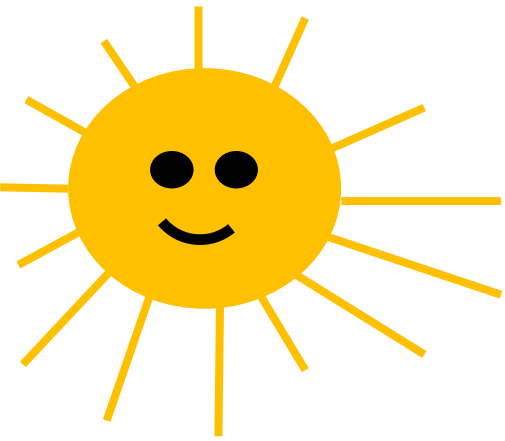
Direct solar dryer

Source:

https://upload.wikimedia.org/wikipedia/commons/4/49/A_solar_food_dryer_that_is_used_to_dry_fruits_and_vegetables.jpg

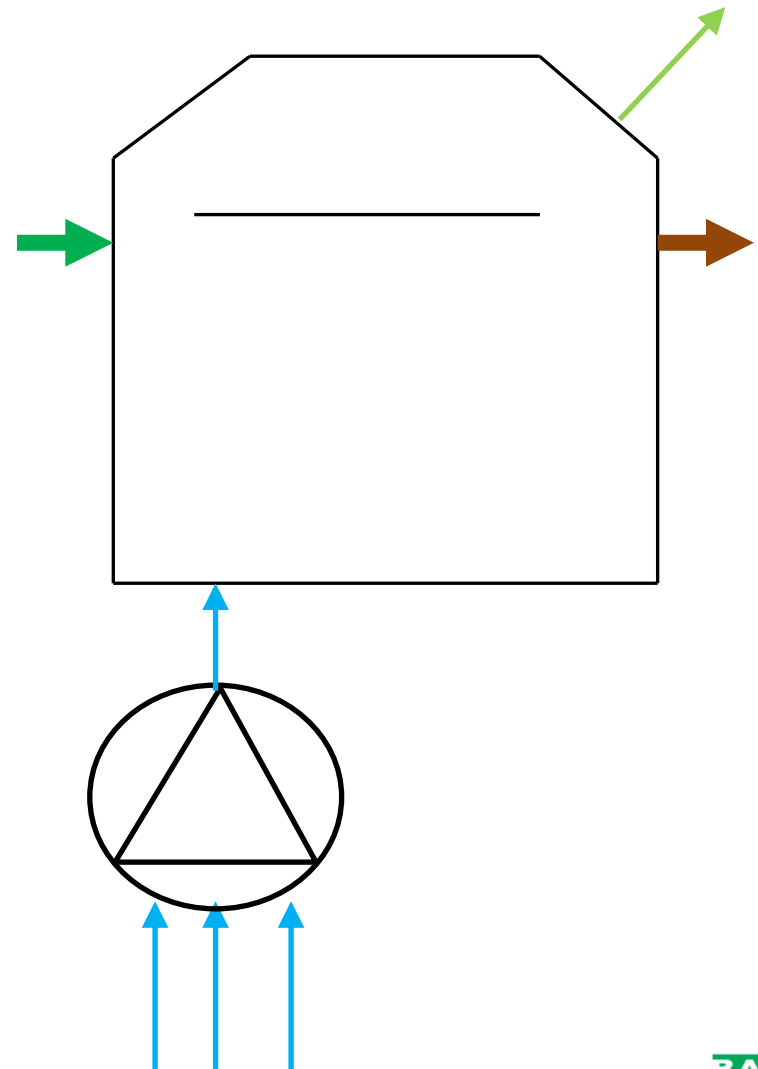
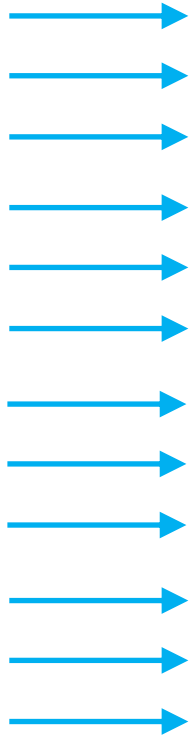
Shafiq Kayondo, CC BY-SA 4.0

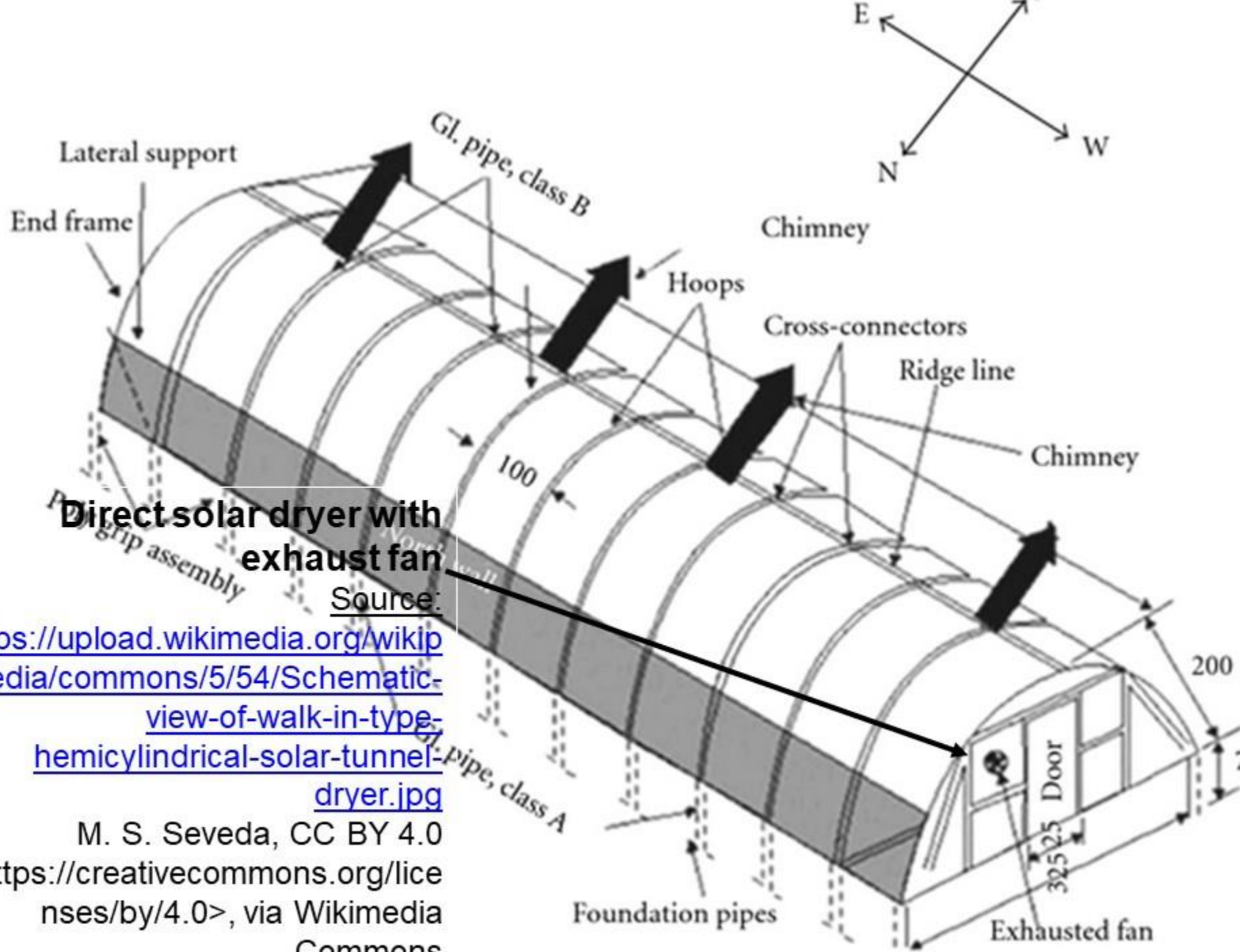
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6) Direct solar dryer with fan

A fan can push the ambient air through the dryer and accelerates the drying effect in this way.



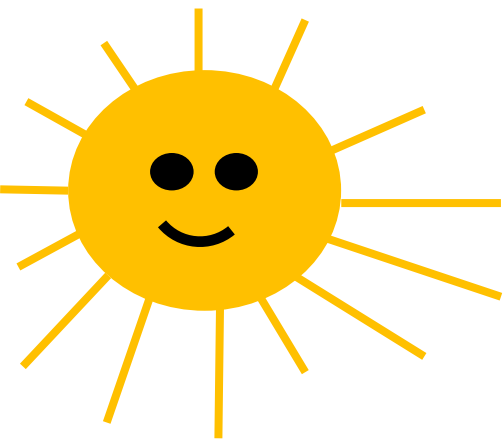


Direct solar dryer with exhaust fan

Source:

<https://upload.wikimedia.org/wikipedia/commons/5/54/Schematic-view-of-walk-in-type-hemicylindrical-solar-tunnel-dryer.jpg>

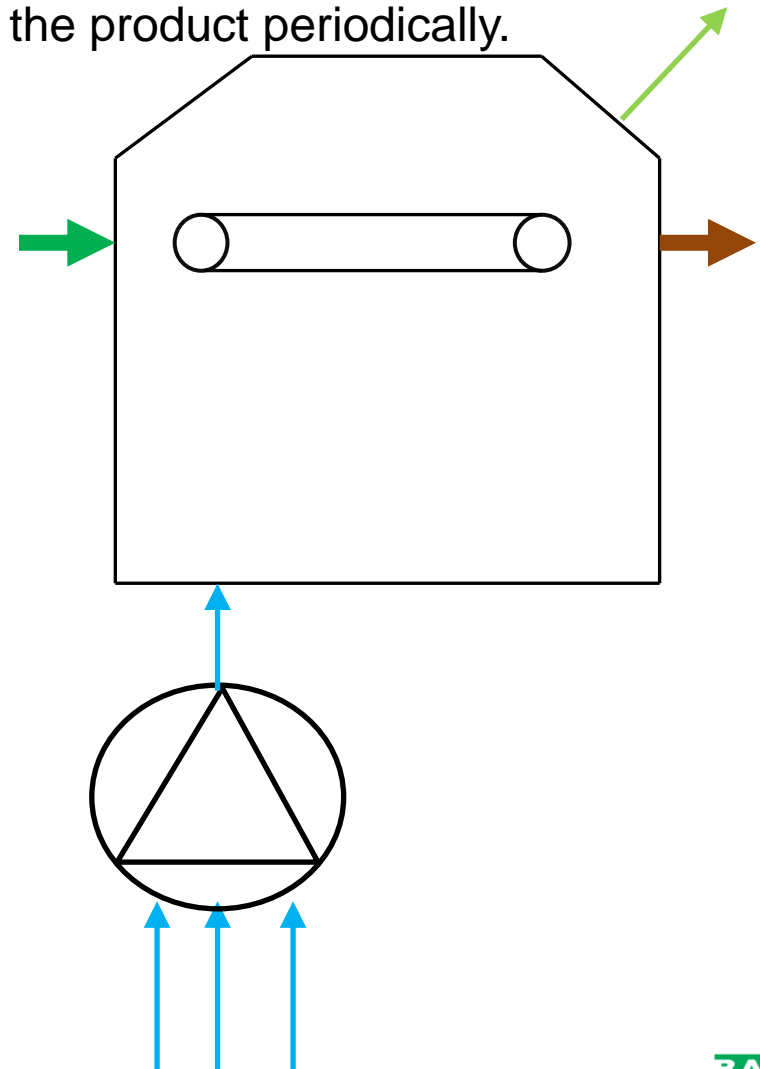
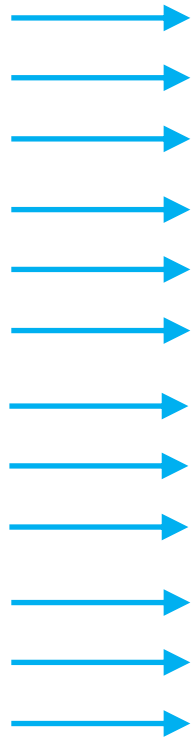
M. S. Seveda, CC BY 4.0
 <<https://creativecommons.org/licenses/by/4.0/>>, via Wikimedia Commons

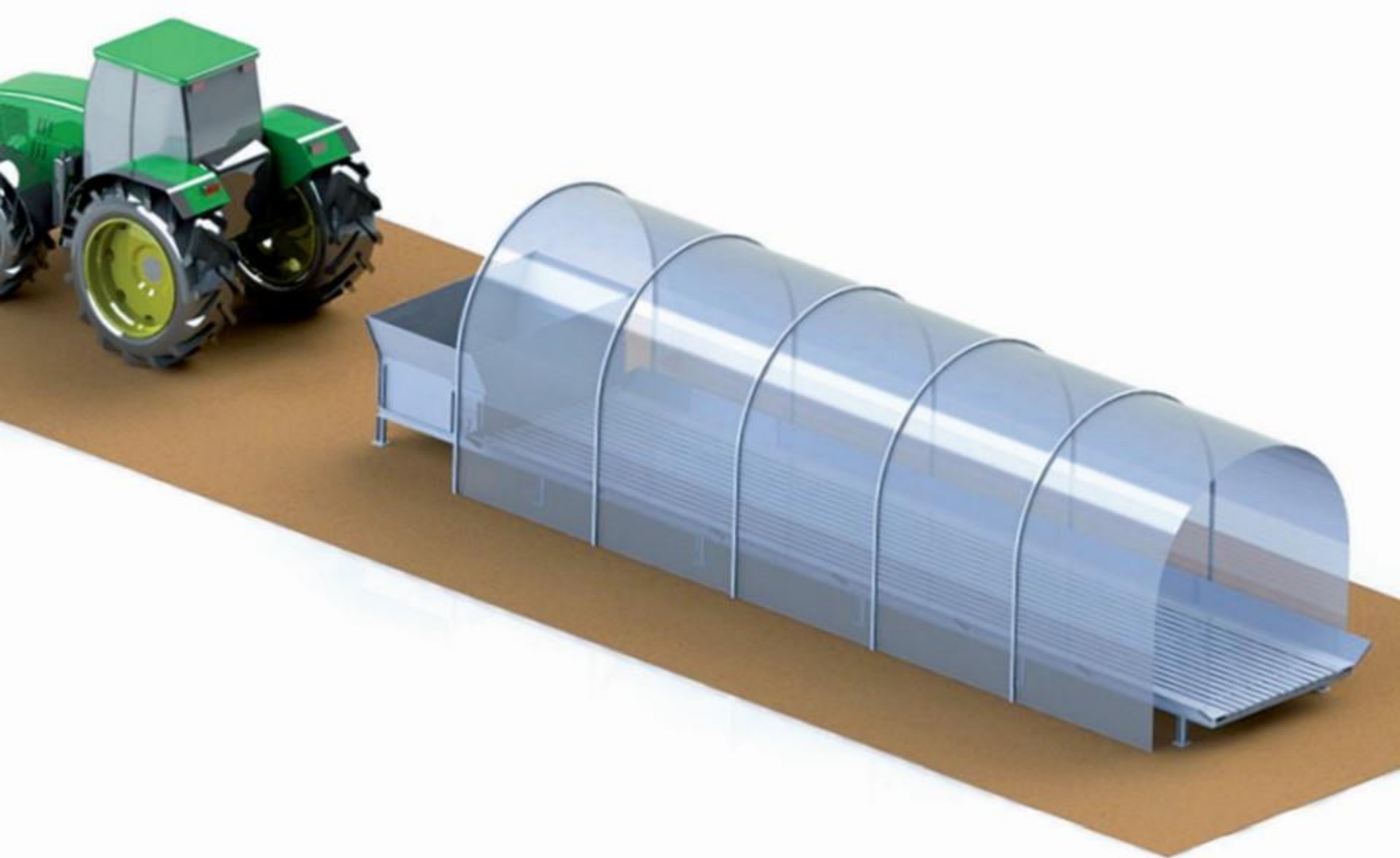


7) Direct solar dryer with mechanical device

Products can be tipped onto a conveyor such as a belt transporter, screw, scraper, moving floor etc.

A stirrer, agitator or metering drum helps to optimize the drying effect by turning around the product periodically.







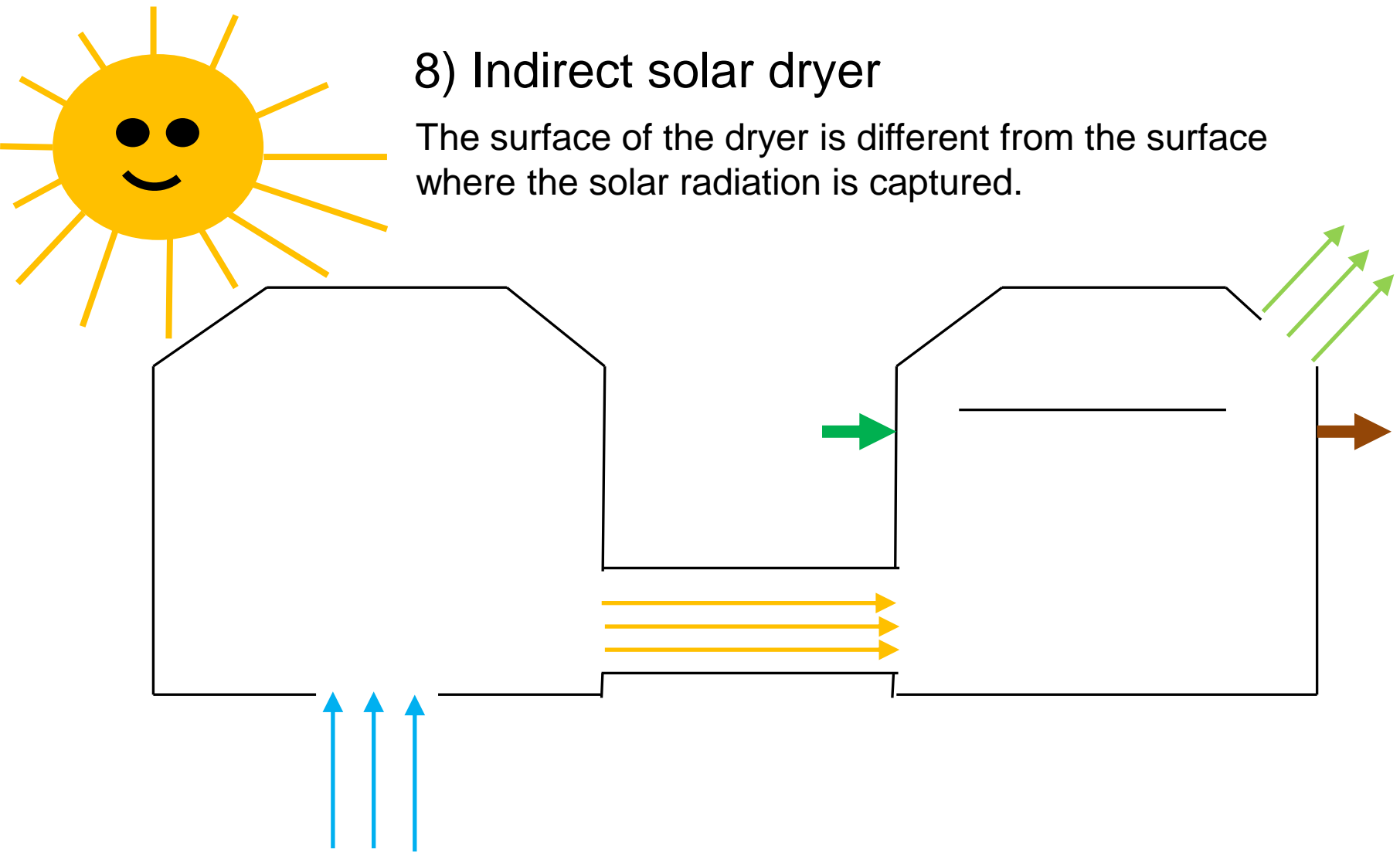


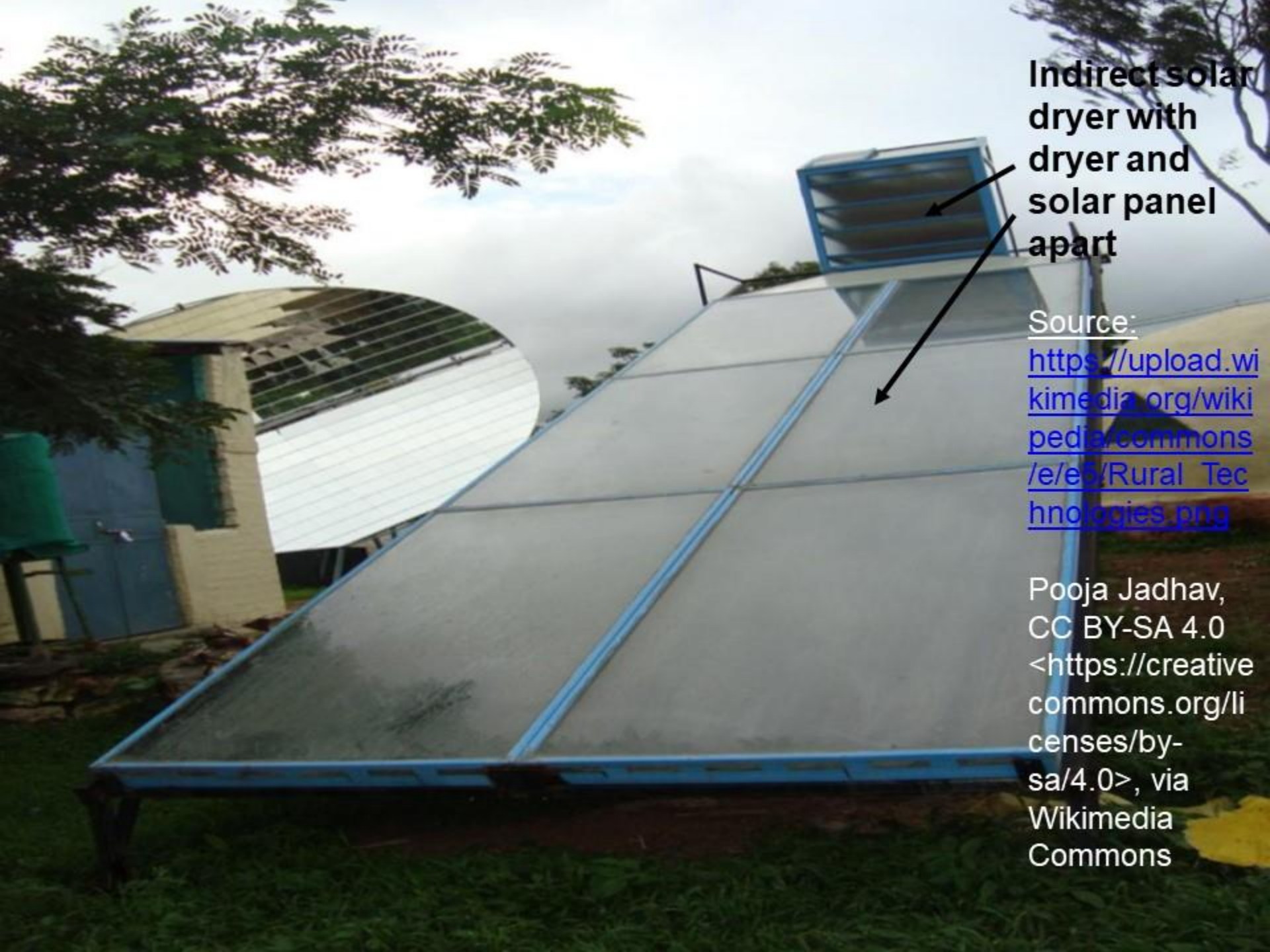




8) Indirect solar dryer

The surface of the dryer is different from the surface where the solar radiation is captured.





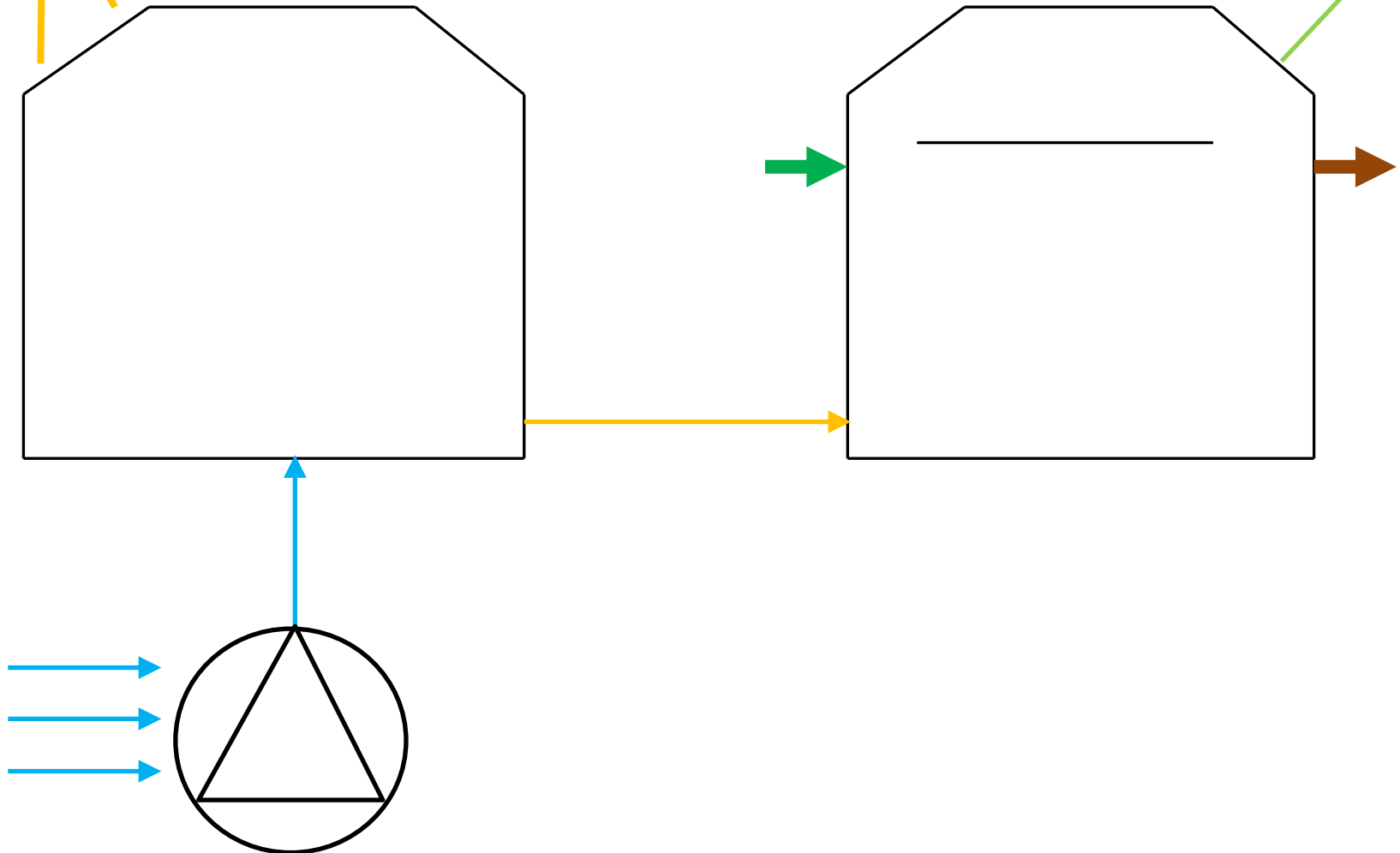
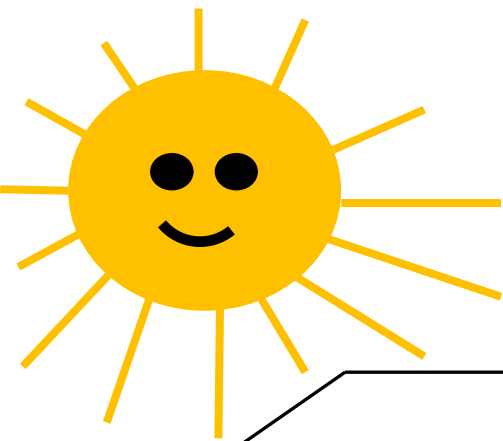
Indirect solar
dryer with
dryer and
solar panel
apart

Source:
[https://upload.wi
kimedia.org/wiki
pedia/commons
/e/e6/Rural Tec
hnologies.png](https://upload.wikimedia.org/wikipedia/commons/e/e6/Rural_Technologies.png)

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censes/by-
sa/4.0](https://creativecommons.org/licenses/by-sa/4.0/)>, via
Wikimedia
Commons

9) Indirect solar dryer with fan

A fan can push the ambient air through the solar panel surface and accelerates the drying effect in this way.



**Radial fans
“pumping” the
heated ambient
air into the dryer**



Solar air heater for a greenhouse made by pop cans

Source:

https://upload.wikimedia.org/wikipedia/commons/a/ab/A_solar_greenhouse_heater_made_of_pop_cans_%286207536284%29.jpg

stephen boisvert from Chicago, United States, CC BY 2.0

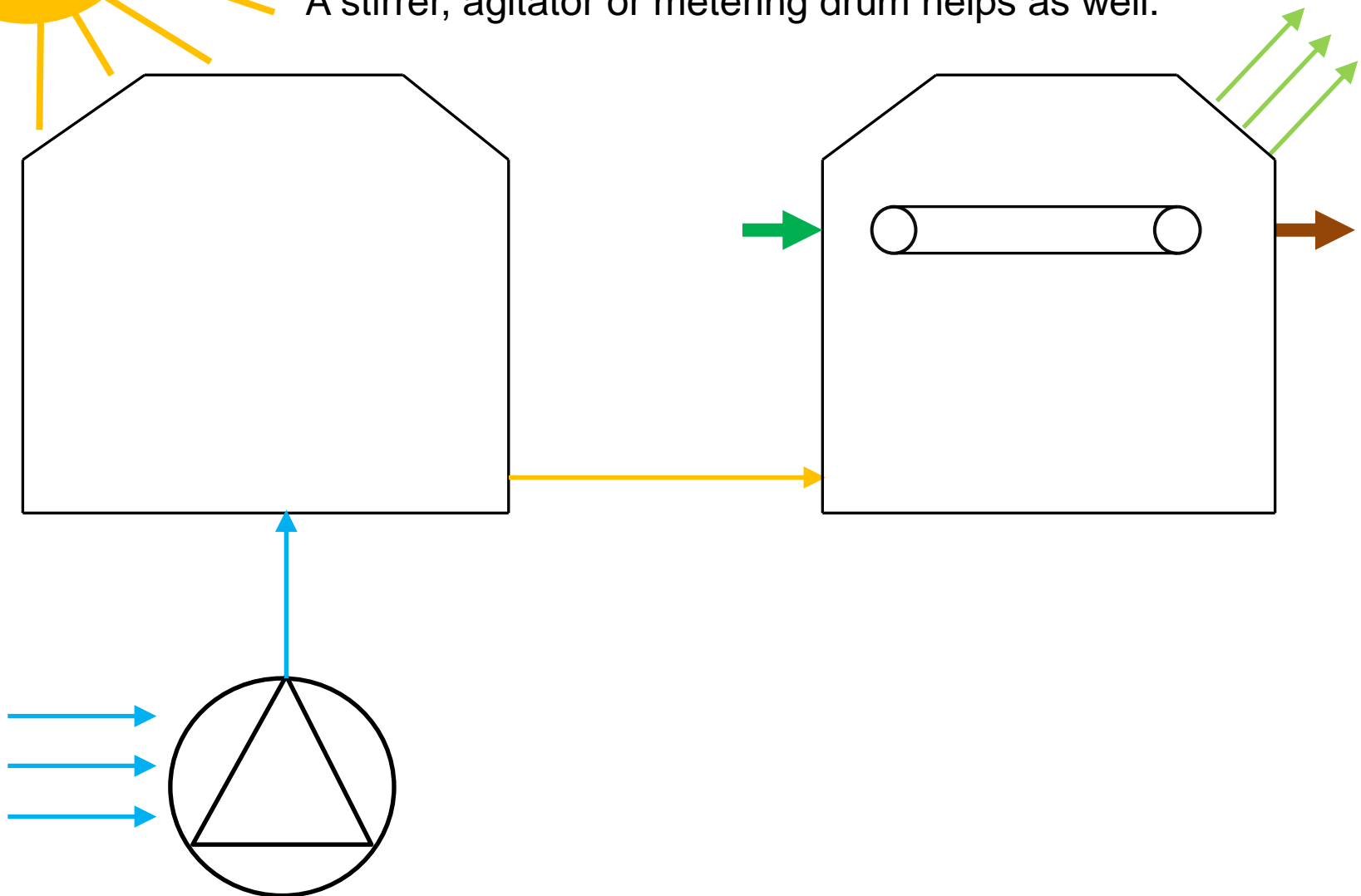
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10) Indirect solar dryer with mechanical device

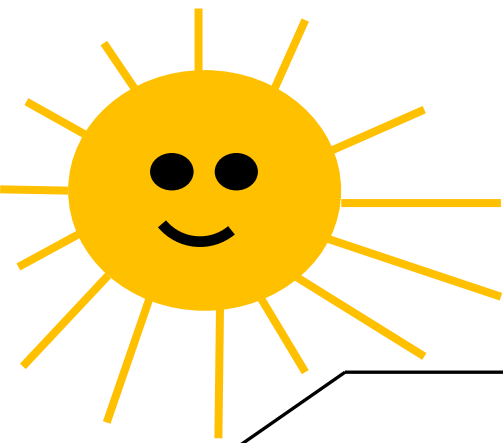
Products can be tipped onto a conveyor such as a belt transporter, screw, scraper, moving floor etc.

A stirrer, agitator or metering drum helps as well.



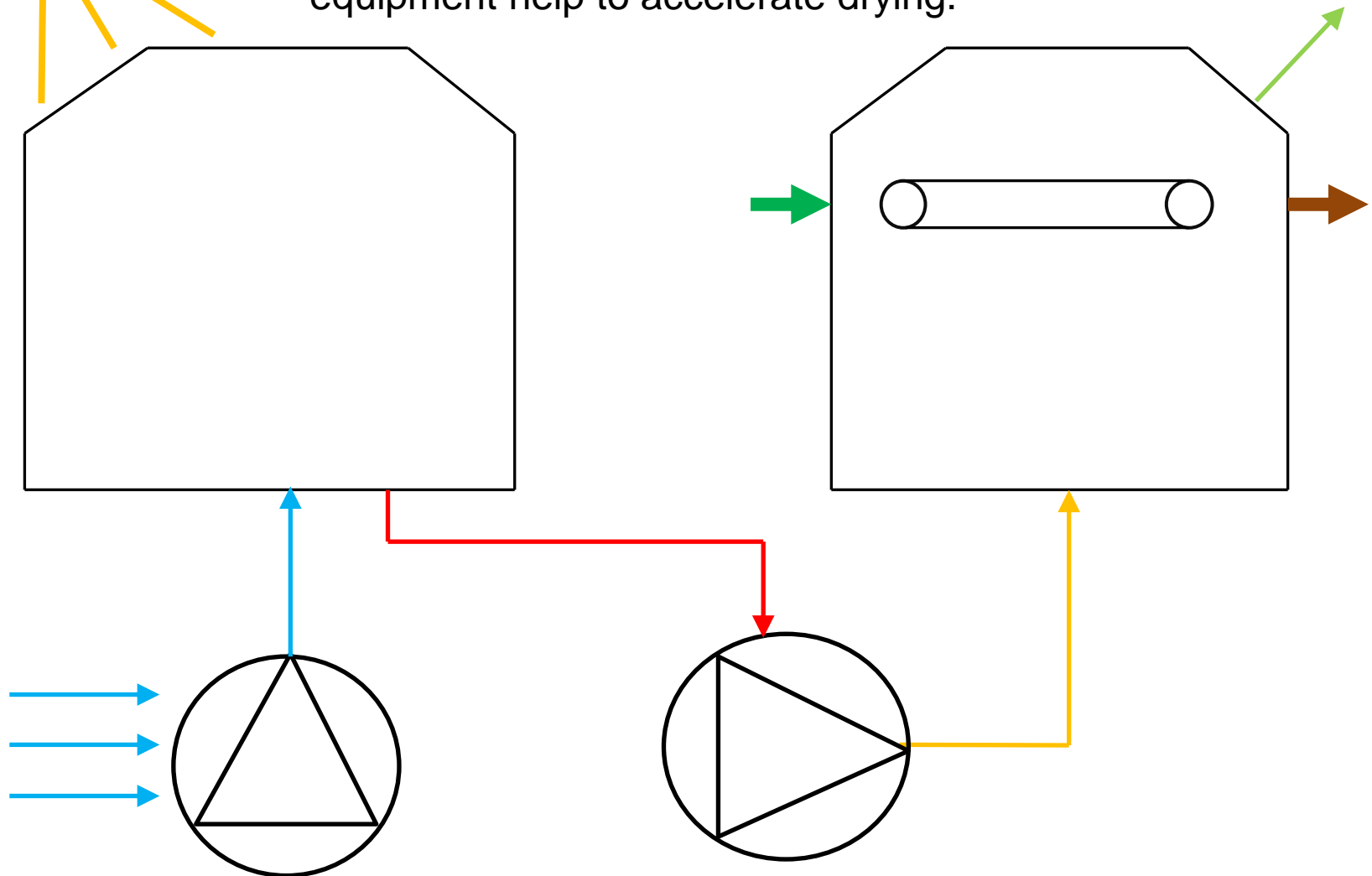
**A “3 stage moving floor”
dryer is such a dryer
using hot ambient air**





11) Dryer with mechanical device separated from solar hot air panels

Mechanical device such as conveying, stirring or mixing equipment help to accelerate drying.





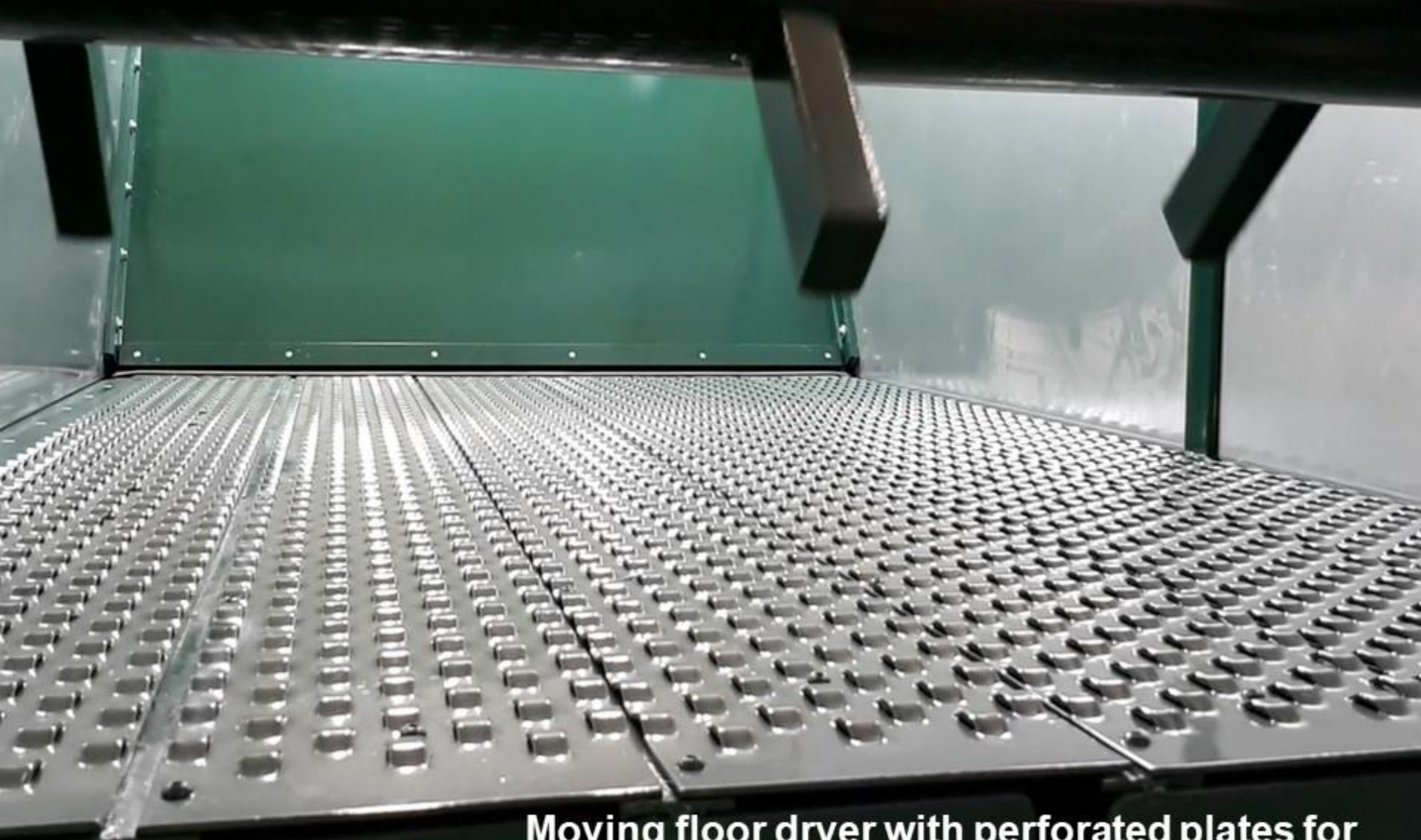
Indirect solar dryer with hot air panels powered by a radial fan

Source:

[https://upload.wikimedia.org/wikipedia/commons/a/ae/Solar Food Dryer.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ae/Solar_Food_Dryer.jpg)

Cachogaray, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

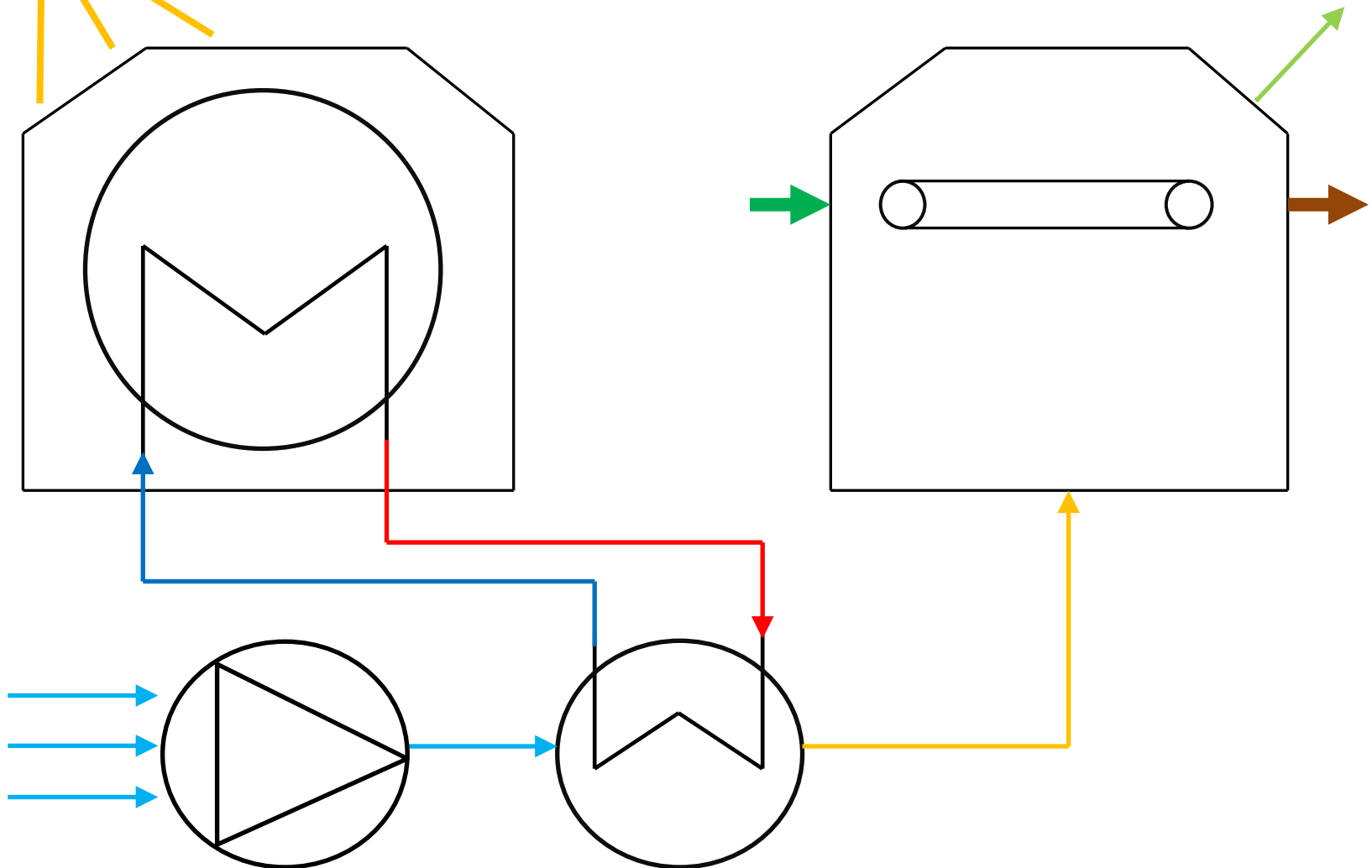
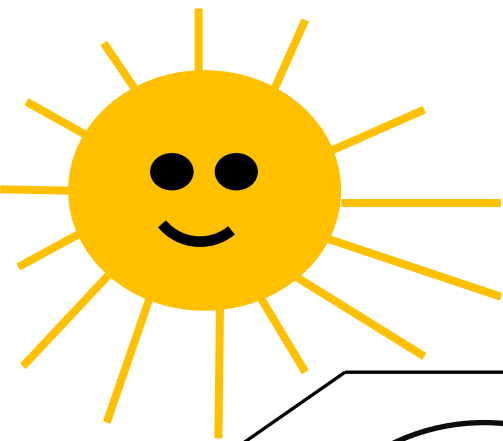
Metering drum mixing up humid products

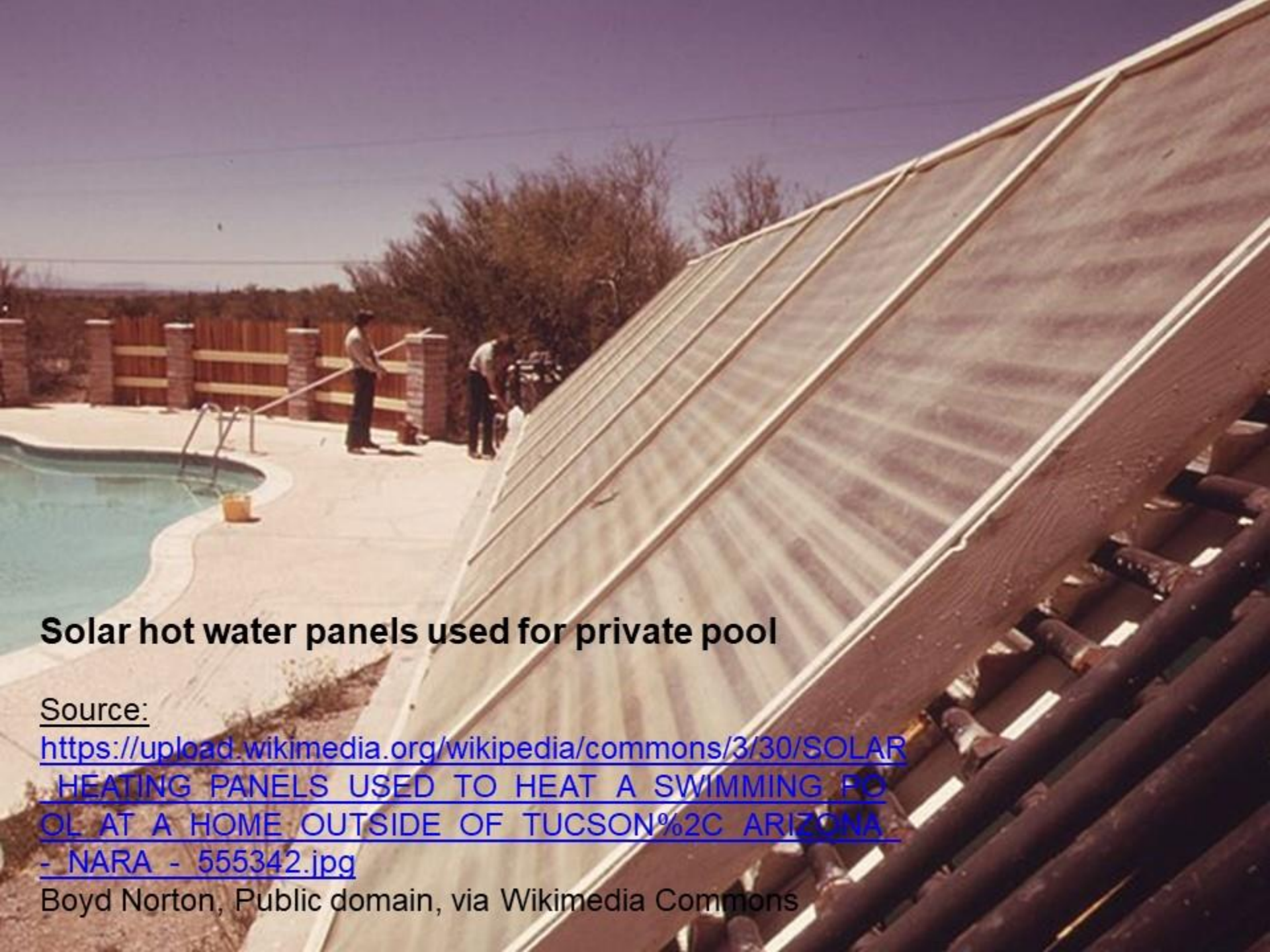


Moving floor dryer with perforated plates for hot air passage

12) Dryer separated from solar hot water panels

Hot water panels create heat that is transmitted to ambient air thanks to heat exchangers.





Solar hot water panels used for private pool

Source:

[https://upload.wikimedia.org/wikipedia/commons/3/30/SOLAR HEATING PANELS USED TO HEAT A SWIMMING POOL AT A HOME OUTSIDE OF TUCSON%2C ARIZONA - NARA - 555342.jpg](https://upload.wikimedia.org/wikipedia/commons/3/30/SOLAR_HEATING_PANELS_USED_TO_HEAT_A_SWIMMING_POOL_AT_A_HOME_OUTSIDE_OF_TUCSON%2C_ARIZONA_-_NARA_-_555342.jpg)

Boyd Norton, Public domain, via Wikimedia Commons

Solar hot water panels

Source:

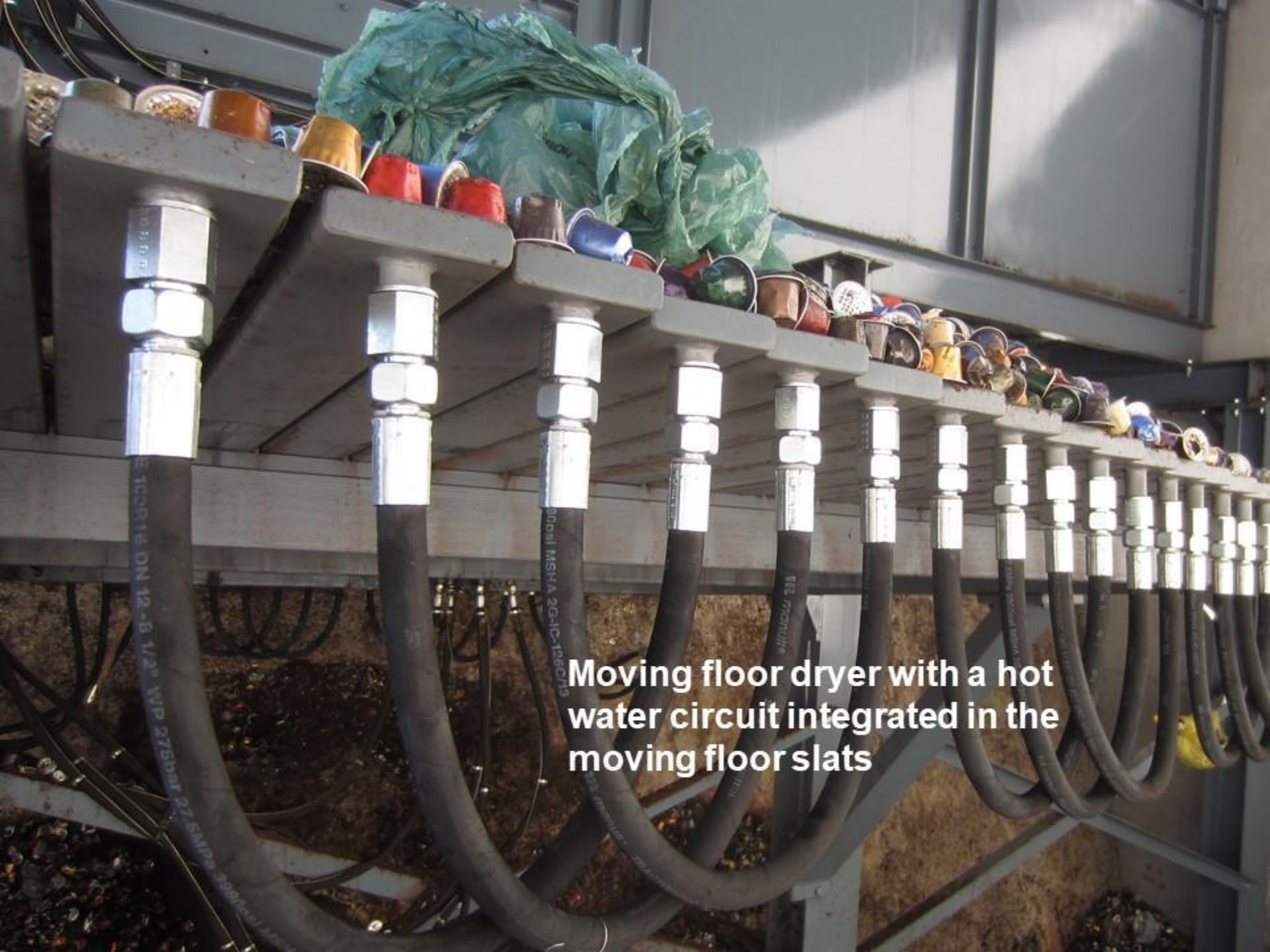
<https://upload.wikimedia.org/wikipedia/commons/4/4d/Marstal.powerplant.1.jpg>

Erik Christensen, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons



**Solar hot water panel
fueling a moving floor
dryer**

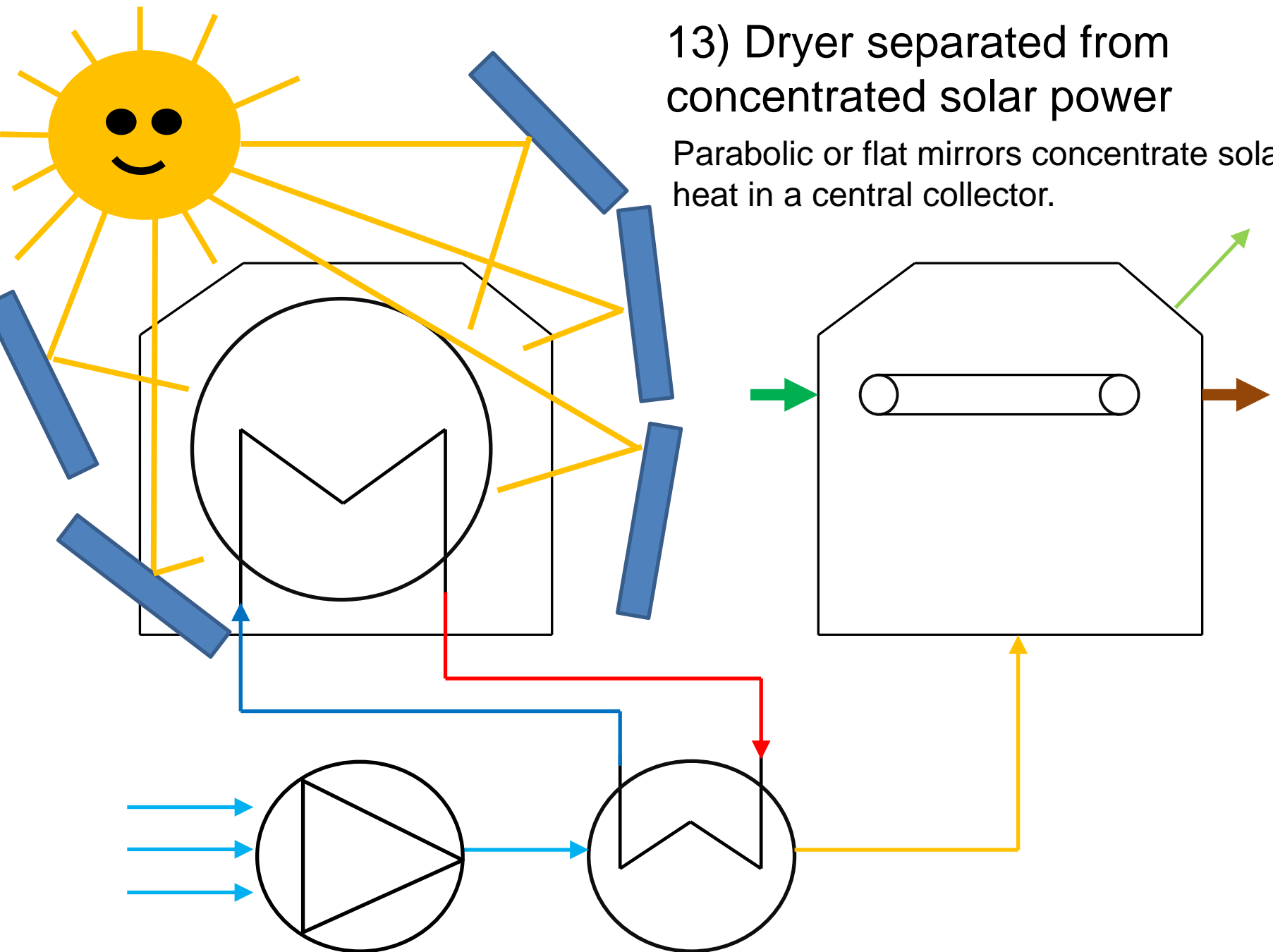




Moving floor dryer with a hot water circuit integrated in the moving floor slats

13) Dryer separated from concentrated solar power

Parabolic or flat mirrors concentrate solar heat in a central collector.



Concentrated solar power

Source:

https://upload.wikimedia.org/wikipedia/commons/3/36/Concentrador_Solar_Cil%C3%ADndrico.jpg

Jtonodr, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via
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Concentrated solar power

Source:

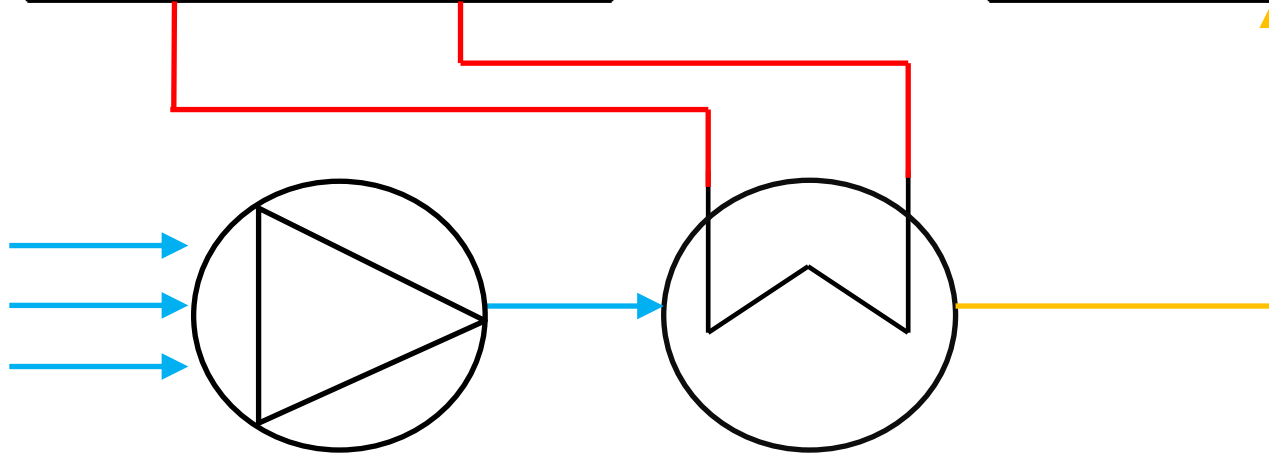
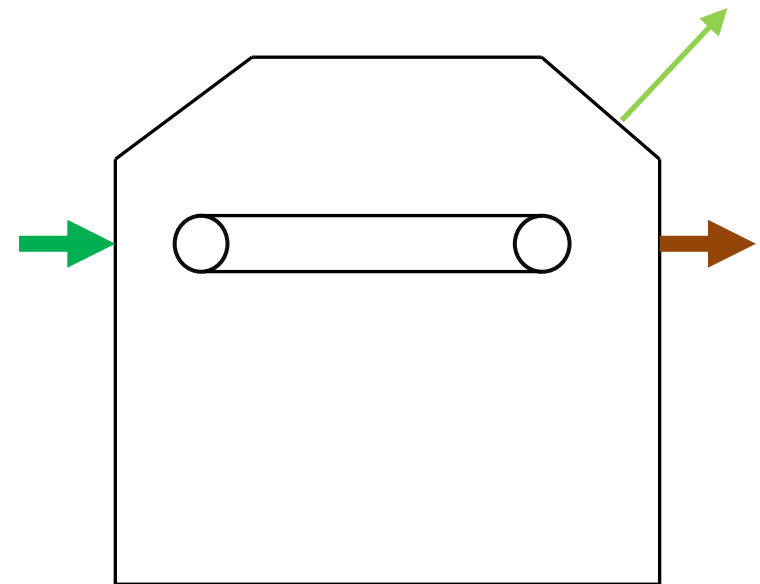
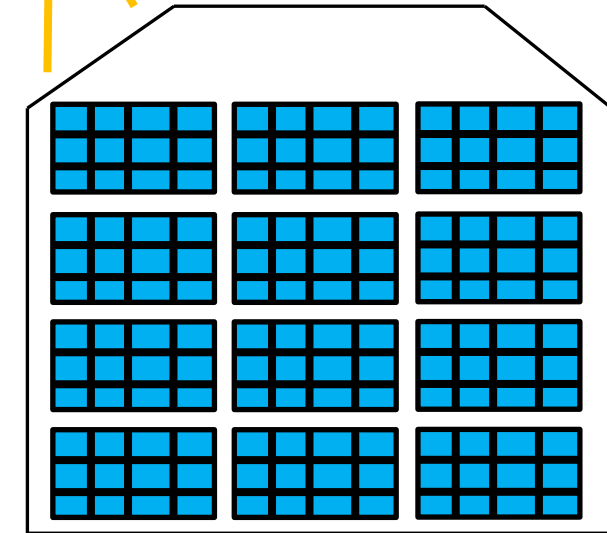
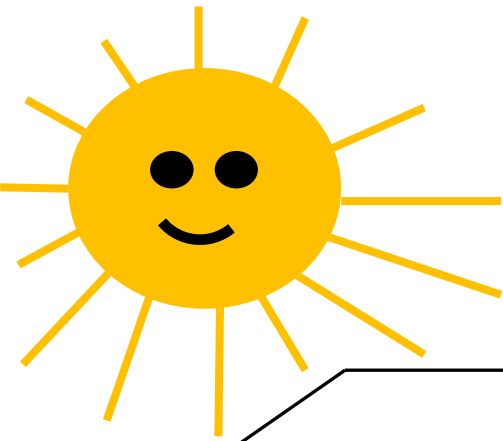
https://upload.wikimedia.org/wikipedia/commons/6/63/Solar_Plant_kl.jpg

USA.Gov - BLM - BUREAU OF LAND MANAGEMENT, Public domain, via
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14) Dryer separated from photovoltaic panels

Photovoltaic panels create electricity to heat ambient air.



Photovoltaic panels

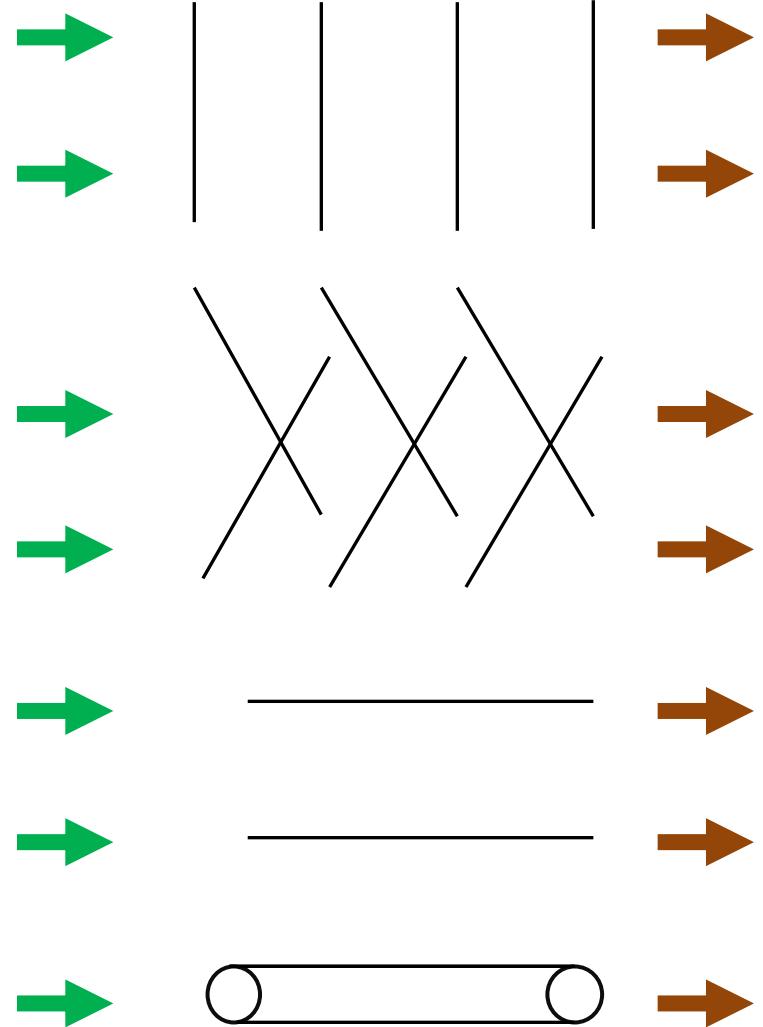
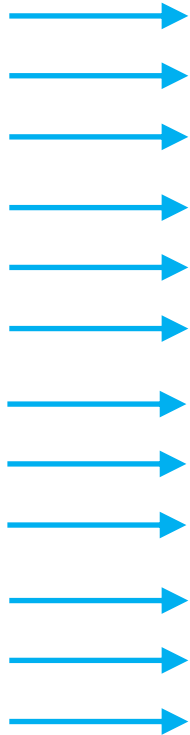
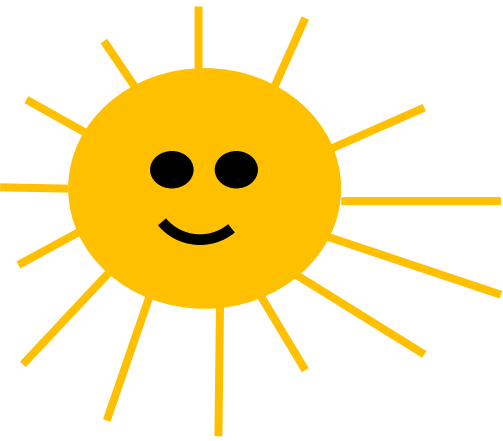
Source:

https://upload.wikimedia.org/wikipedia/commons/0/0a/Photovoltaic_Panels.JPG

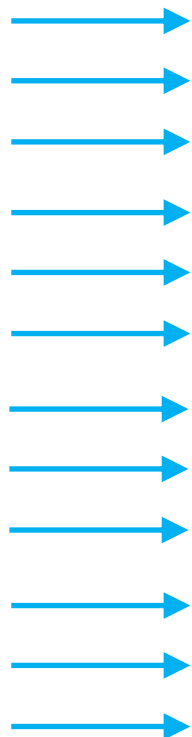
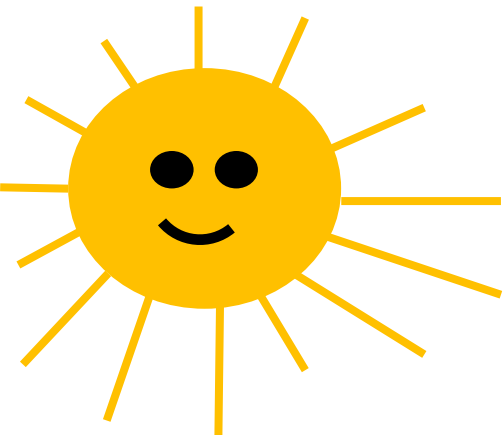
Noggen13, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0>>, via
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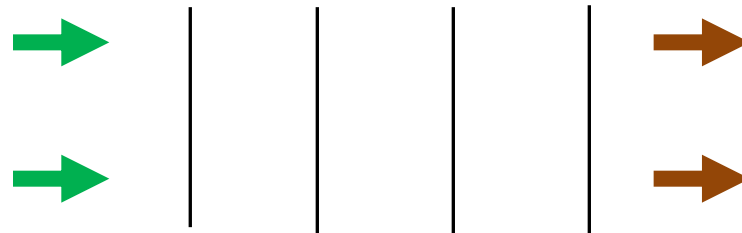
SUMMARY: 4 types of Natural (open) dryer



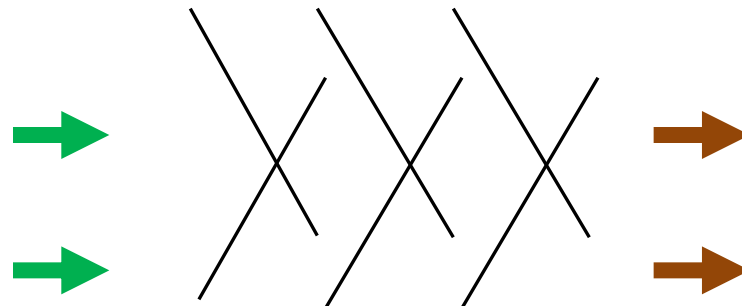
SUMMARY: 4 types of Natural (open) dryer



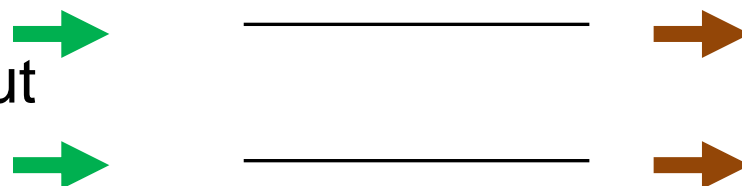
1) Hanging



2) Stacking



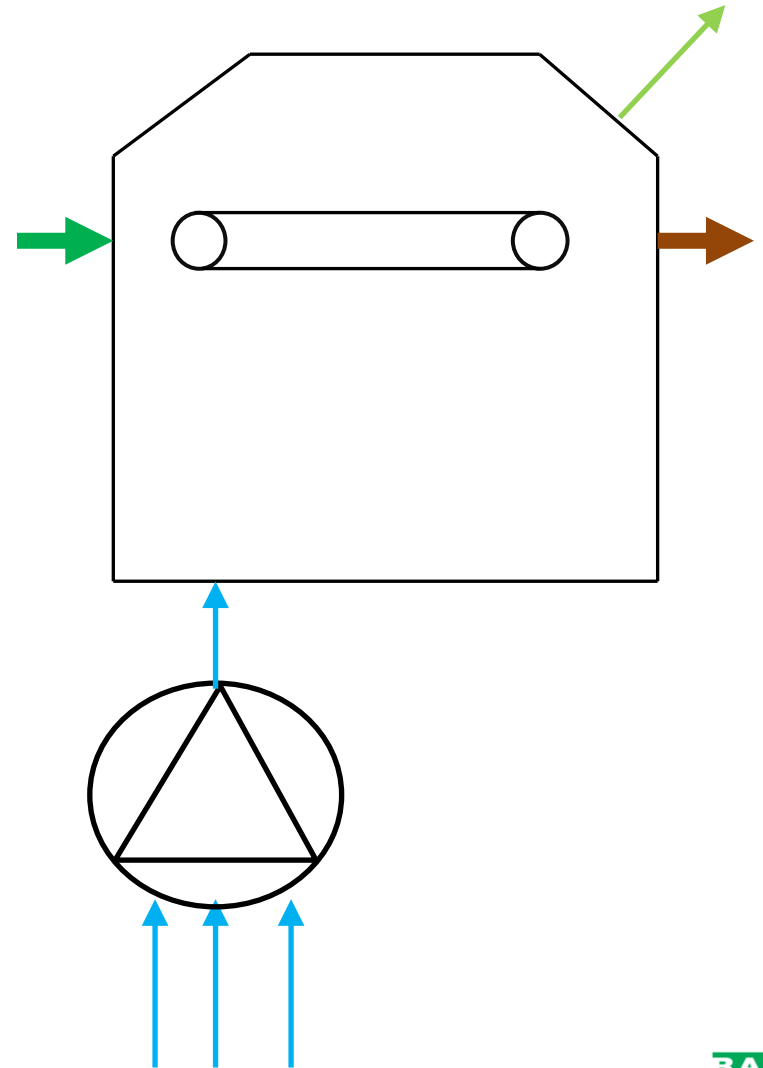
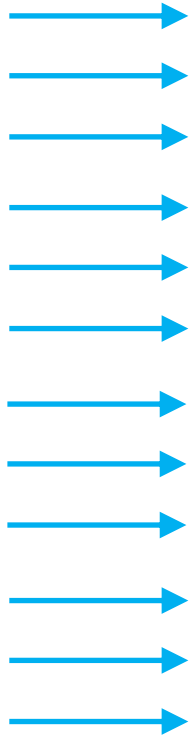
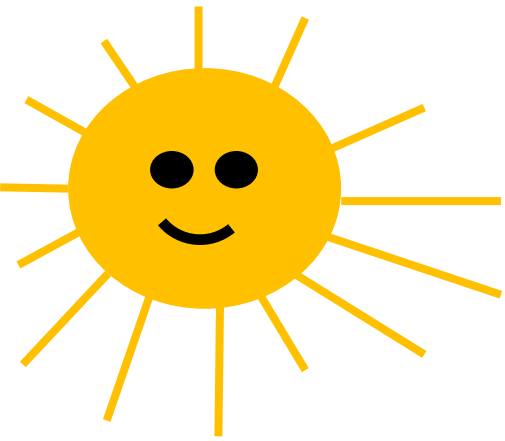
3) Spreading out



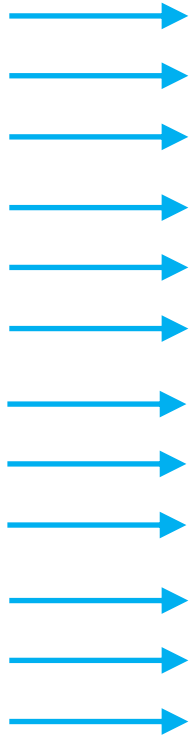
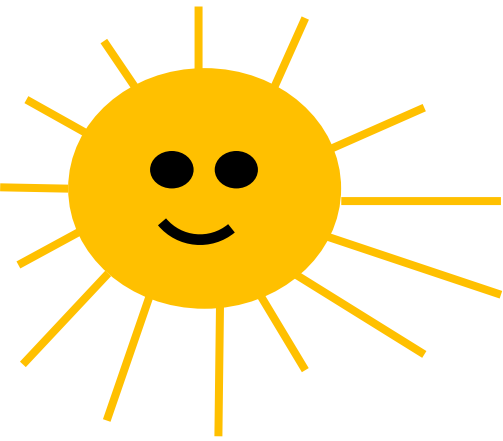
4) Conveying



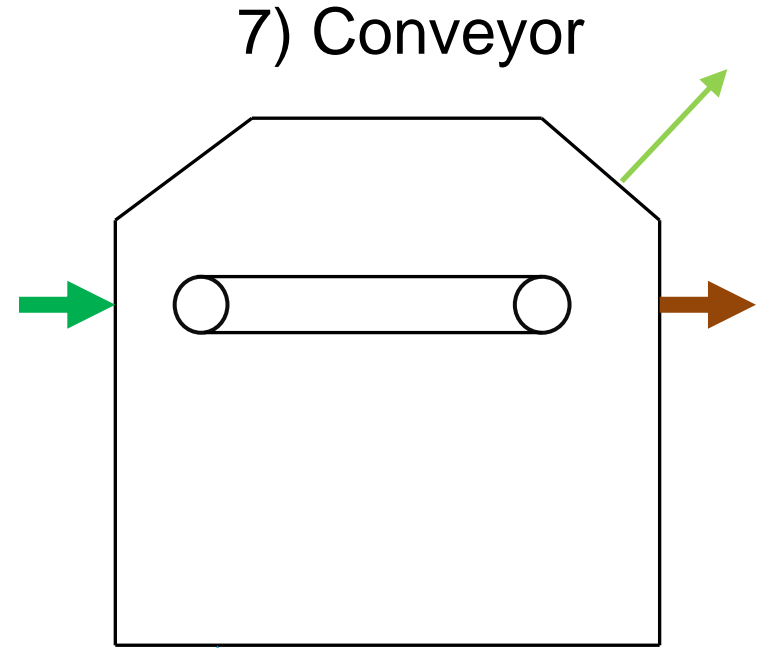
SUMMARY: 3 types of Direct (housed) dryer



SUMMARY: 3 types of Direct (housed) dryer

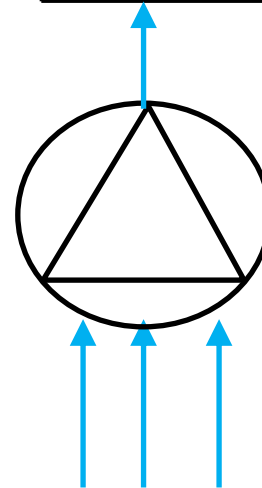


5) Housing

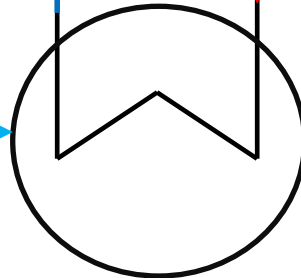
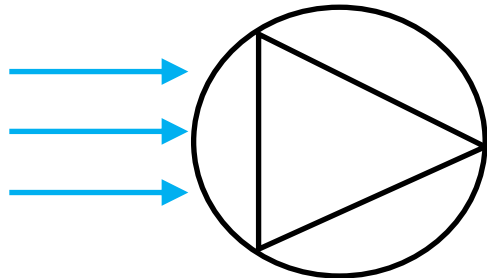
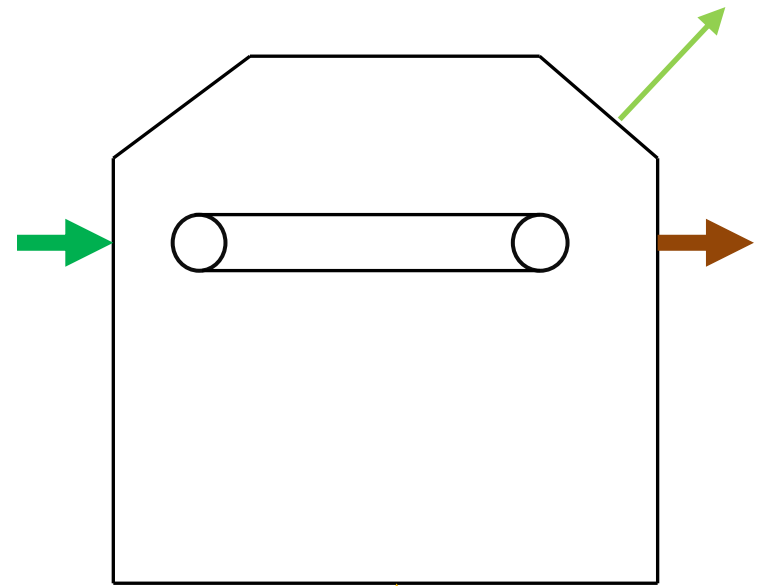
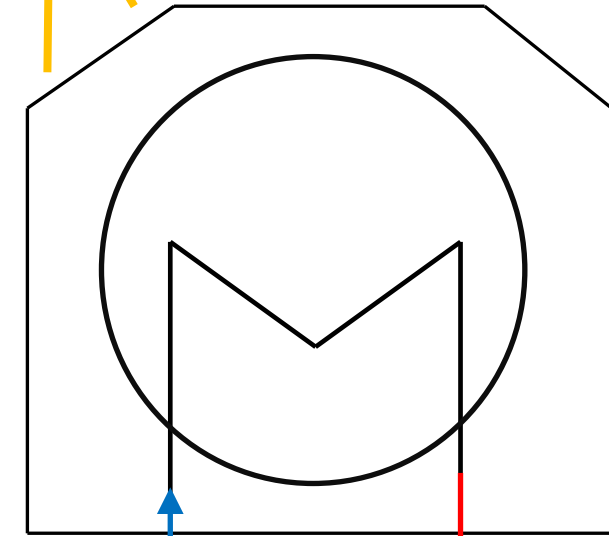
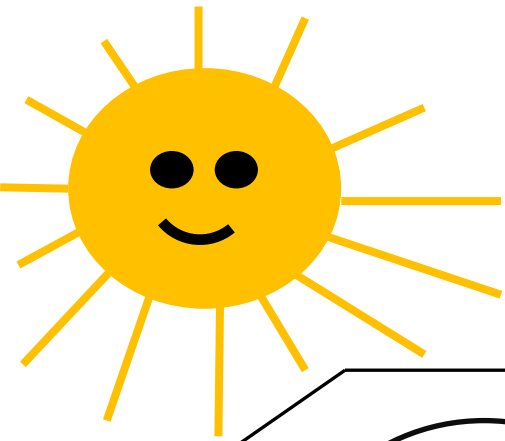


7) Conveyor

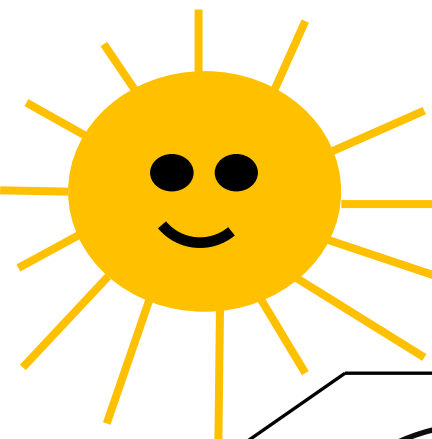
6) Blower



SUMMARY: 8 types of Indirect dryer



SUMMARY: 8 types of Indirect dryer



13) Concentrating panels instead of standard panels

8) Separate housing for standard solar air panels

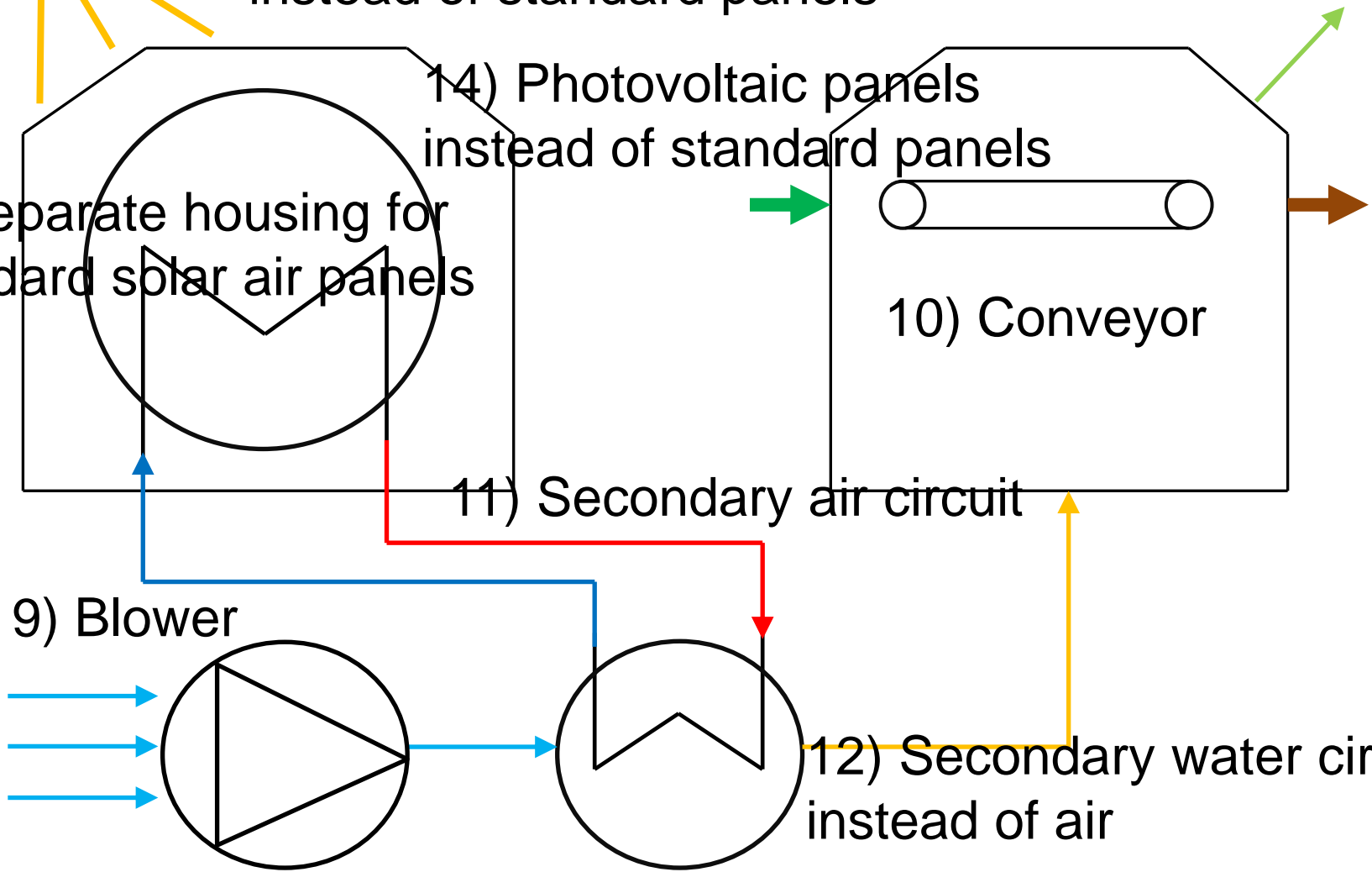
14) Photovoltaic panels instead of standard panels

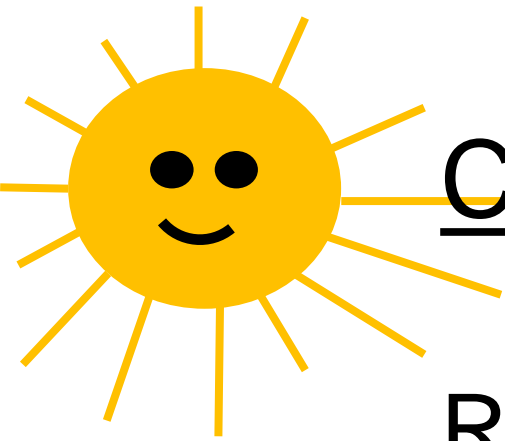
10) Conveyor

11) Secondary air circuit

9) Blower

12) Secondary water circuit instead of air





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For further information,



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